

100. A nucleic acid encoding a non-naturally-occurring transcriptional regulatory protein that comprises:

a chimeric nucleic acid binding domain including at least two nucleic acid binding motifs, at least one of which is a zinc finger; and

a transcriptional regulatory domain, wherein the non-naturally-occurring transcriptional regulatory protein (a) recognizes a nucleic acid sequence not recognized by a protein containing only one of the nucleic acid binding motifs present in the transcriptional regulatory protein, and (b) when bound to the recognized sequence, regulates transcription from an operatively linked promoter.

101. The nucleic acid of claim 99 or 100, wherein the nucleic acid binding domain includes at least two zinc fingers.

102. The nucleic acid of claim 99 or 100, wherein the nucleic acid binding domain includes at least a second nucleic acid binding motif selected from the group consisting of helix-loop-helix motifs, helix-turn-helix motifs, basic domains, zinc fingers, and combinations thereof.

103. The nucleic acid of claim 99 or 100, wherein the transcriptional regulatory domain activates transcription.

104. The nucleic acid of claim 99 or 100, wherein the transcriptional regulatory domain represses transcription.

105. The nucleic acid of claim 99 or 100, wherein at least one nucleic acid binding motif is selected from the group consisting of helix-loop-helix motifs, helix-turn-helix motifs, basic regions, and combinations thereof.

106. The nucleic acid of claim 99 or 100, wherein the zinc finger is from a protein selected

from the group consisting of transcription factor IIIA, SW15, Krüppel, Hunchback, and a steroid receptor.

107. The nucleic acid of claim 99 or 100, wherein the zinc finger is from Zif268.

108. The nucleic acid of claim 99 or 100, wherein the at least two nucleic acid binding motifs are separated by at least one amino acid.

109. The nucleic acid of claim 99 or 100, wherein each of the nucleic acid binding motifs, when incorporated into a protein, binds to a specific DNA sequence element.

110. The nucleic acid of claim 109, wherein the nucleic acid encodes a protein that recognizes a composite binding site made up of the specific DNA sequence elements recognized by the nucleic acid binding motifs.

111. The nucleic acid of claim 110, wherein the nucleic acid encodes a protein that binds to the composite binding site with higher affinity than it does to any of the specific DNA sequence elements.

112. A vector comprising a nucleic acid of claim 99.

113. The vector of claim 112, further comprising expression control sequences permitting gene expression in eukaryotic cells.

114. A kit comprising a vector of claim 112 and a gene operably linked to a composite binding site to which the chimeric transcription factor encoded by the vector binds.

115. A vector comprising a nucleic acid of claim 100.

116. The vector of claim 115, further comprising expression control sequences permitting gene expression in eukaryotic cells.
117. A kit comprising a vector of claim 115 and a gene operably linked to a composite binding site to which the non-naturally-occurring transcriptional regulatory protein encoded by the vector binds.
118. A method for modulating expression of a gene in a cell, comprising:
 providing a cell containing a chimeric DNA binding element operatively linked to a promoter; and
 expressing the nucleic acid of claim 99 in the cell, such that the chimeric transcription factor is produced, binds to the chimeric DNA binding element, and regulates transcription from the promoter.
119. A method for modulating expression of a gene in a cell, comprising:
 providing a cell containing a chimeric DNA binding element operatively linked to a promoter; and
 expressing the nucleic acid of claim 100 in the cell, such that the non-naturally-occurring transcriptional regulatory protein is produced, binds to the chimeric DNA binding element, and regulates transcription from the promoter.

Remarks

Amendment:

All of the previously-pending claims have been cancelled from the case, without prejudice. Applicant specifically reserves the right to re-introduce identical claims, or otherwise to continue its pursuit of the previously-claimed subject matter, in one or more continuing applications.

The cancelled claims have been replaced with new claims 99-119, each of which is directed to a nucleic acid encoding a chimeric transcription factor (or a transcriptional regulatory